

April 22, 2021

VIA IBFS

Momentum Inc.
3050 Kenneth Street
Santa Clara, CA 95054

Karl A. Kensinger
Acting Chief, Satellite Division
International Bureau
Federal Communications Commission
45 L Street, NE
Washington, DC 20554

RE: Response to FCC Letter
IBFS File No. SAT-STA-20200831-00102

Dear Mr. Kensinger:

Momentum Inc. (“Momentum”) hereby responds to your letter dated April 21, 2021, requesting additional information and clarifications regarding the above-referenced application.¹ For your convenience, the questions (without footnotes) are reproduced below in italics.

1. Momentum seeks waiver of 47 CFR 25.113(g), which requires approval for orbital deployment and a station license before a space station may be deployed and operated in orbit. We ask that Momentum provide responses to Form 312 Main Form, Application for Satellite Space Station Authorizations, Questions 29-34 and 36-40. To the extent that Momentum has already supplemented the application with information responsive to question 40, please provide the information in a single updated supplement.

An updated and revised Exhibit 2, which specifically responds to these questions, is attached to this letter.

2. Will Momentum be communicating for the full 180-days using the requested frequency bands – and will any portion of this time be after the satellite perigee has been lowered to 150 km? In other words, will the period of spacecraft disposal that follows the lowering of the perigee to 150 km begin before the 180-day mark, and if so, will telemetry, tracking and command communications continue for any portion of that period?

Momentum will be communicating on the requested frequency bands, as necessary, for the full 180 days. It is possible that some portion of the 180 days will include time when VR-2 has a perigee lower than 150 km. For clarity, spacecraft disposal - *i.e.*, the period of time following the lowering

¹ See Letter to Philip Hover-Smoot, Momentum Inc., from Karl A. Kensinger, FCC (April 21, 2021).

of perigee to 150 km - is planned to begin prior to the 180-day mark. To the extent possible, Momentus will continue to conduct telemetry, tracking, and command communications during the period when the perigee of VR-2 is below 150 km.

3. The Orbital Debris Assessment Report (ODAR) at page 17 states that Momentus VR-2 will ensure “real time collision avoidance and orbital maintenance maneuvers.” Will the VR-2 reserve fuel for conducting avoidance maneuvers during its mission? Would the VR-2 retain fuel for conducting collision avoidance during the period following the lowering of the perigee to 150 km to the extent that communications with the spacecraft are maintained? If so, what type of reserve would be expected to remain?

The VR-2 will operate with an approximately 20% margin of propellant, in addition to the propellant necessary to achieve the operational concept (including lowering of perigee to 150 km at end of mission). Momentus contemplates that this reserve will serve as support for all contingencies during the VR-2 mission, including orbital debris avoidance maneuvers. To clarify, the VR-2's capacity for “real time collision avoidance and orbital maintenance maneuvers,” is constrained by the availability of uplink and downlink opportunities and thus such maneuvers may not be available in real time during those parts of orbit that are outside of ground station range. The amount of reserve remaining following an orbital debris avoidance maneuver would depend on the nature and duration of the avoidance maneuver. Anecdotally, however, a single kilogram of propellant can power many kilometers of orbital adjustment. Additionally, there is historical evidence that collision avoidance maneuvers are rare, and conjunction avoidance is usually accomplished with orbital adjustments of less than 1 km. Accordingly, Momentus expects to have sufficient propellant reserves to conduct multiple contingency operations, including during spacecraft disposal.

4. Please describe whether, and if so, how, Momentus will be sharing information regarding initial deployment, ephemeris, and planned maneuvers with the 18th Space Control Squadron.

Momentus will be sharing mission information with the 18th Space Control Squadron (“18SPCS”). Momentus and the 18SPCS signed a Space Situational Awareness Sharing agreement to support the coordination of Momentus missions. The 18SPCS has created a folder on our Space-Track.org accounts for us to upload our maneuvers, ephemeris or other relevant data. In producing this data, Momentus will follow the formatting required by the "Spaceflight Safety Handbook for Operators." Additionally, Momentus will actively coordinate with 18SPCS via email or phone as circumstances dictate.

5. With regard to the VR-2 Microwave Electrothermal Thruster, please provide the PFD calculations showing that the VR-2 meets the requirements for ITU RR 21.16 for the 5670-5725 MHz range as indicated in the original Narrative (filed on August 31, 2020) at page 12. Please also indicate whether the electromagnetic emissions of the VR-2 thruster would exceed $15 \times \text{SQRT}(\text{power}/500)$ uV/m at a distance of 300 meters.

Per our calculations, our PFD at the Earth's surface is approximately -221 dB(W/m²), which meets the limits specified in ITU RR 21.16 for all angles of arrival.

PFD Calculation

=====
PFD = $P \cdot G / (4 \cdot \pi \cdot D^2)$
P = -7.27 dBW/4kHz Ref BW (750W)
 $\theta = 0^\circ$
D = 150.0 km (worst case - decommissioning)
G = $1E-10$ (as measured)²
PFD = -221.78 dBW/m² @ 4.0 kHz Ref BW

The as-measured emission from the Microwave Electrothermal Thruster at 5725 MHz indicates approximately 47 dBuV/m at 10 meters. Converting this result to uV/m at 300 meters gives approximately 7.5 uV/m, which is within the 15 uV/m limit. In addition, there is expected to be further attenuation given the aluminum structure surrounding the thruster, which has no gaps larger than the wavelength (~5 cm).³

6. Please provide a demonstration as to how VR-2 will comply with the PFD limit in ITU RR 22.5. Specifically, please provide the PFD calculations for the 8025-8400 MHz space-to-Earth transmit band of the VR-2.

ITU RR 22.5 indicates that in 8025-8400 MHz "the maximum power flux-density produced at the geostationary-satellite orbit by any Earth exploration-satellite service space station shall not exceed -174 dB(W/m²) in any 4 kHz band." Per our calculations, our PFD at geostationary orbit assuming we have reached 1000 km in altitude and are pointed directly at geostationary orbit is approximately -190 dBW/m², which complies with the limit.

PFD Calculation

=====
PFD = $P \cdot G / (4 \cdot \pi \cdot D^2)$
P = -34.26 dBW/4kHz Ref BW (1.5W)
 $\theta = 0^\circ$
D = 34786.0 km
G = 3.98
PFD = -190.08 dBW/m² @ 4.0 kHz Ref BW

7. The supplemental letter filed by Momentus on March 29, 2021 specifies that there will be three customer "payloads" not deployed from the VR-2, and that all three are deployers. The letter states there will be four 12U deployers, one 3U deployer and two other deployers (size not provided.) The updated ODAR also filed on March 29, 2021 specifies, in the inputs to the NASA Debris Assessment Software (DAS), that the VR-2 contains four 12U deployers, one 3U deployer

² As measured, there is a gain of less than -100 dBi within the 5670-5725 MHz range.

³ Due to the operation of the equipment as part of the spacecraft, Momentus believes the VR-2 thruster should not be characterized as Industrial, Scientific or Medical equipment. See 47 C.F.R. §18.101, et. seq. In any event, as discussed above, due to the low calculated emissions levels, the frequency range within which the thruster will operate, and the operations of the equipment in space, the emissions from the propulsion system are unlikely to cause harmful interference to any authorized services.

and one “PocketPod” deployer. See March 29, 2021 ODAR at page 42-44. Please clarify the correct number of each type of deployer, the customer, and its associated size. Also, please provide a list of the spacecraft that will be deployed from each of the individual deployers.

There are three sets of deployers, as follows: four (4) 12U ISI Launch QuadPacks; one (1) 8P FOSSA PocketPod; and one (1) 3U Planetary Systems Corp. Containerized Satellite Dispenser (CSD). The latter two sets of deployers are customer deployers (i.e. are customer payloads). Originally, there were two (2) 8P FOSSA PocketPod deployers but the second is no longer part of the mission and has been replaced by a mass dummy. Accordingly, the ODAR correctly states there is only one (1) 8P PocketPod deployer, and the March 21, 2021, letter incorrectly stated there were two such deployers.

Provided below is the list of deployers and their respective payloads.

“U” = 10x10x10 cm

“P” = 5x5x5 cm

Deployer	Deployer Size	Deployer Customer	Deployed Spacecraft	Spacecraft Size
ISI Launch QuadPack #1	12U	Momentus	BroncoSat-1	1.5U
			FEES2	0.3U
			Gossamer	1U
			Guardian-alpha	3U
			IRIS-A	2U
			OreSat0	1U
ISI Launch QuadPack #2	12U	Momentus	Kepler-16	6U
			Kepler-17	6U
ISI Launch QuadPack #3	12U	Momentus	SteamSat-2	3U
ISI Launch QuadPack #4	12U	Momentus	STORK-1	3U
			STORK-2	3U
			STORK-3	3U
FOSSA PocketPod	8P	FOSSA Systems ⁴	Challenger	3P
			SanoSat-1	1P
			TRSI3	1P
Planetary Systems Corp. CSD	3U	NASA	TROPICS Pathfinder	3U

As identified above, the following customer payloads are no longer on the VR-2 mission: Spartan, Neptuno, and QMR-KWT.

⁴ The FOSSA PocketPod payloads listed in this table are customers of FOSSA systems, and not direct Momentus customers. These constituents erroneously did not appear as individually payloads in our March 21 letter but are identified here.

8. The supplemental letter filed by Momentus on March 29, 2021 also specifies that one of the satellites will be 1.5U in size and one will be 0.3U. Will the associated 0.5U and 0.7U remain empty on the Momentus VR-2?

Any difference between the deployer size and total payload size inside a given deployer will be occupied by a non-deploying spacer, which is a small lightweight frame provided by ISI Launch that fits into a QuadPack like a cubesat in order to occupy unutilized volume within the deployer. Spacers are attached to the QuadPack pusher plate and are not deployed into space. More specifically, BroncoSat-1 (1.5U) will share a 3U slot inside the QuadPack with OreSat0 (1U) and a non-deployable 0.5U spacer. FEES2 (0.3U) will share a 3U slot (not a 1U slot as the question assumes) inside the QuadPack with a 2.7U non-deployable spacer.

9. Regarding the recontact mitigation provided on page 11 of the updated March 29, 2021 ODAR, please provide an updated list of all spacecraft to be deployed that are capable of propulsive maneuvers and indicate whether those spacecraft would have the capability to use propulsion as a means of collision avoidance.

The Guardian-alpha and SteamSat-2 spacecraft are capable of propulsive maneuvers. However, neither has the capability to use propulsion as a means of collision avoidance for recontact mitigation purposes.



If you require any further information related to this application, please contact Philip Hover-Smoot at 415.254.1295 or via phhs@momentus.space.

Very Respectfully,

A handwritten signature in black ink, appearing to read "PHHS", with a long horizontal line extending to the right.

Philip Hover-Smoot
Deputy General Counsel
Chief Ethics & Compliance Officer
Momentus Inc.

Attachment

cc: (w/attachment)

Merissa Velez
Jay Whaley

EXHIBIT 2
Momentum Ownership Exhibit

MOMENTUS INC. OWNERSHIP INFORMATION
(Revised April 22, 2021)⁵

Momentum Inc. (“Momentum”) is a privately held corporation. Provided below are responses to questions 29-34 and 36-40 of the Form 312. Section 310(b)(4) of the Communications Act of 1934, as amended, establishes certain limitations on indirect foreign ownership and voting of certain common carrier and broadcast licensees. By definition, these limitations do not apply to the non-broadcast, noncommon carrier operations of Momentum, as proposed in this application.

- Question 29: NO
- Question 30: N/A. See discussion above.
- Question 31: N/A. See discussion above.
- Question 32: N/A. See discussion above.
- Question 33: N/A. See discussion above.
- Question 34: N/A. See discussion above.
- Question 36: NO
- Question 37: NO
- Question 38: NO
- Question 39: NO

In response to Question 40, listed below are the parties that currently have a 10% or greater equity and/or voting interest in Momentum:⁶

1. Entities Associated with Mikhail Kokorich⁷
c/o Momentum Inc.

⁵ This revised Exhibit 2 provides modest updates to reflect recent changes to Momentum ownership and greater specificity regarding the proposed SPAC transaction.

⁶ The ownership percentages listed in this application are fully diluted percentages and all voting interests listed in this application are based on total outstanding stock, taking into account that certain classes of stock are “high vote” stock with 10 votes per share.

⁷ This interest is held of record by Dorsey & Whitney Trust Company LLC, as trustee of the Mikhail Kokorich 2021 Irrevocable Trust under agreement dated March 1, 2021 and as the voting trustee of Momentum Inc. Voting Trust Agreement dated March 1, 2021.

3050 Kenneth Street

Santa Clara, CA 95054

Ownership Interest: approximately 19% (see discussion below)

Voting Interest: approximately 47% (see discussion below)

Nationality: Russia

2. Brainyspace LLC⁸

16047 Collins Avenue, Unit 1603

Sunny Isles Beach, Florida 33160

Ownership Interest: approximately 17% (see discussion below)

Voting Interest: approximately 36% (see discussion below)

Nationality: U.S.

3. Dakin Sloss

General Partner, Prime Movers Lab ("PML")⁹

PO Box 12829

Jackson, WY 83002

PML Ownership Interest: approximately 29%

PML Voting Interest: approximately 10%

Nationality: U.S.

OFFICERS, DIRECTORS, AND SENIOR LEADERS

⁸ Olga Khasis is the manager of Brainyspace LLC, and Dorsey & Whitney Trust Company LLC, in its role as trustee of the irrevocable trust created under the Irrevocable Trust Agreement of Olga Khasis u/a/d March 1, 2021, is the sole member of Brainyspace LLC. Ms. Khasis is a U.S. citizen. She is the wife of Momentus' co-founder Lev Khasis, who is a Russian citizen and a U.S. permanent resident.

⁹ The following three PML entities are Momentus shareholders: Momentus PML SPV 1 LP, Prime Movers Lab Fund I LP and Momentus PML SPV 2 LP.

All of the directors, officers, and senior leaders of Momentus may be reached at the following address:

c/o Momentus Inc.
3050 Kenneth Street
Santa Clara, CA 95054

CEO, Director	<i>Dawn Harms¹⁰</i>
President	<i>Dr. Fred Kennedy</i>
Director, Chairman	<i>Dakin Sloss</i>
Director	<i>Vince Deno</i>
General Counsel	<i>Alexander Fishkin</i>
Assoc. General Counsel	<i>Philip Hover-Smoot</i>
CFO	<i>Jikun Kim</i>
CTO	<i>Rob Schwarz</i>
Controller	<i>Temitope Oduozor</i>

Further Discussion

In early 2021, Momentus underwent a change in its senior leadership. Effective January 23, 2021, Mr. Kokorich, one of the co-founders of Momentus, resigned as CEO and as a member of Momentus' Board of Directors. Dawn Harms, who was previously the company's Chief Revenue Officer, has been appointed interim CEO and has been elected to serve as a member of the Board of Directors.

Subsequently, as of March 1, 2021, each of (i) Mr. Kokorich (and Nortrone Finance S.A., which is wholly owned and controlled by Mr. and Mrs. Kokorich), and (ii) Brainyspace LLC (the sole member of which is Olga Khasis, a U.S. citizen and wife of Lev Khasis, a co-founder and former director of the Company who is a legal permanent U.S. resident and also a Russian citizen), have relinquished their ability to direct the voting of any shares in Momentus through the

¹⁰ Each senior leader or director listed is a U.S. citizen. Additionally, the following leaders hold current or unassigned but activatable Personal Security Clearances: Dawn Harms (TS/SCI-eligible), Fred Kennedy (TS/SCI), Philip Hover-Smoot (S), and Rob Schwarz (S).

implementation of trust structures and certain voting arrangements. The Momentus shares of which they are beneficial owners will be voted as directed by voting advisors designated by the board of directors of Momentus. The current voting advisors are certain senior officers of Momentus. As is true of all Momentus senior officers, the voting advisors are U.S. citizens. Agreements that govern the trust structures provide that any successor voting advisors will be subject to approval by the CFIUS monitoring agencies and must be U.S. citizens. The trust agreements specify that the shares that are the subject of the trust structures are to be divested by March 1, 2024.

Momentus plans to merge with Stable Road Acquisition Corp. (Nasdaq ticker symbol: SRAC) (“SRAC”), which is a publicly traded special purpose acquisition company (the “SPAC Transaction”), and will be listed as a publicly traded company. After the closing, no persons will have any board appointment or nomination rights or any veto or consent rights with respect to any actions of Momentus. Momentus and SRAC have agreed that, subject to approval by a majority vote of SRAC’s shareholders, the board will consist of (1) the interim CEO of Momentus, Dawn Harms (who is a U.S. citizen), (2) Brian Kabot, the Chairman and Chief Executive Officer of SRAC (who is a U.S. citizen), and (3) two independent directors, Vince Deno and Chris Hadfield (Mr. Deno is a U.S. citizen and Mr. Hadfield is a Canadian citizen). In addition, SRAC and Momentus are in the process of identifying additional U.S. citizens to be nominated to serve on the post-SPAC transaction board, which process is being led by Mr. Kabot. Momentus will update the Commission of changes.

Pursuant to the merger agreement, as amended on March 5, 2021 (as it may be further amended from time to time, the “Merger Agreement”), by and among Momentus, SRAC, Project Marvel First Merger Sub, Inc., a Delaware corporation and a direct, wholly owned subsidiary of

SRAC (“First Merger Sub”), and Project Marvel Second Merger Sub, LLC, a Delaware limited liability company and a direct, wholly owned subsidiary of SRAC (“Second Merger Sub”), First Merger Sub will merge with and into Momentus (the “First Merger”), with Momentus being the surviving corporation of the First Merger. Immediately following the First Merger, the surviving corporation will merge with and into Second Merger Sub, with Second Merger Sub being the surviving company of the second merger. Following the mergers, SRAC will be renamed Momentus Inc. and such combined operating company would continue to have its Class A common stock and public warrants listed on Nasdaq and trade under the ticker symbols “MNTS” and “MNTSW”, respectively.

Accordingly, upon completion of the SPAC Transaction, the FCC application or license, if granted by that date, will be held by Second Merger Sub, and the new Momentus Inc. will be the direct parent company of the FCC applicant or licensee, as applicable.